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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/586,177	07/17/2006	Holger Timinger	DE040018US1	2751

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EXAMINER

BRUTUS, JOEL F

ART UNIT	PAPER NUMBER
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3777

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,177	Applicant(s) TIMINGER ET AL.	
	Examiner JOEL F. BRUTUS	Art Unit 3777	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 4-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sachar (Pub. No.: US 2005/0096589) stand alone or in view of Evans et al (US Pat: 6,468,265).

Regarding claims 1 and 10, Sachar discloses a catheter Guidance Control and Imaging (GCI) uses radar system 1000 to measure location and orientation of catheter tip 377 by using fiducials [see 0073, 0019-0020] and a 6-DOF (degree of freedom) sensor configured to detect moving body organs such as heart and synchronize their motions [see 0016, 0019-0020]. Sachar discloses a plurality of x-ray images of body structures and display these images synchronized with image of catheter tip 377 on monitor 325 [see 0075]. Sachar disclose superimposing onto image 702 motion between tip 377 and body organ [see 0077].

With regards to movement model that describes with respect to at least one phase; Applicant discloses the movement model is stored in the form of parameters (data) and/or functions (software) in a memory of the data processing device which is designed to calculate a "movement-compensated location" of the instrument with respect to a "current" location, measured with the locating device, of the instrument

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and to the "current" value, measured in parallel therewith using the sensor device, of the movement parameter and "movement-compensated location" denotes that location that is estimated with the movement model and that the instrument would have in a specified reference phase of the spontaneous movement [see 0009, specification].

Accordingly, Sachar discloses 6 DOF sensors that are configured to measure spontaneous movement parameter data of the body volume caused by heartbeats [see 0016, 0019-0020]. Just as described above, the spontaneous movement parameters data acquired by the sensors constitute the movement model. Sachar discloses a servo system that has a correction input that compensates for the dynamic position of a body part, or organ, such as the heart, thereby offsetting the response such that the actual tip moves substantially in unison with the beating heart [see 0020].

Sachar discloses a controller (or data processing device) that is coupled to the 6DOF sensor, Gimbal motion control and the radar system [see fig 1A, 0021]. Sachar disclose the control system for using movement model, location of movement parameter to calculate an estimated movement compensated location corresponding to vectorial displacement of catheter tip [see 0019-0021]. Sachar discloses the controller 501 calculates an error position (PE) 983 which is the difference between the actual position (AP) 981 and the desired position (DP) 982 of the catheter tip 377, also denoted as curve "C" 985 in FIG. 2L and represented by expression $(PE=[AP-DP])$ [see 0103-0106].

Sachar doesn't explicitly mention interpolation nodes.

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However, as included in claim 10, the interpolation nodes are provided by the instrument; therefore, the radar system 1000 which locates the catheter tip 377 would inherently locate the interpolation nodes.

In addition, Evans et al disclose Evans et al teach correlation between the ECG trace 502 and the displacement motion trace 501 (which a movement parameter, emphasis added) can be derived by the computer control system [see column 27 lines 33-40 and column 27 lines 45-48].

Therefore, one skilled in the art at the time the invention was made would have been motivated to combine Sachar with Evans et al; for precision and accuracy purposes.

Regarding claims 2 and 5, Sachar doesn't specifically mention reconstructing a movement model using location of interpolation nodes and movement parameters.

However, Sachar discloses a Fast Fourier transform module 1103 [see 0067] which is a reconstruction unit as well know in the art that can be used to reconstruct a movement model.

Nevertheless, Evans et al teach reconstruct 3D motion of the heart [see column 79 lines 1-5]. This teaching proves that Evans et al system has the capability of reconstructing movement model from measured values of the location of volume nodes (emphasis added).

Therefore, one with ordinary skill in the art at the time the invention was made would have been motivated to combine Sachar with Evans by reconstructing movement

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model from measured values; in order to accurately and precisely determine the best path for navigating the instrument.

Regarding claim 4, Sachar discloses a plurality of x-ray images of body structures and display these images synchronized with image of catheter tip 377 on monitor 325 [see 0075]. Sachar further discloses three dimensional imaging [see 0009, 0111].

In addition, Evans et al teach the system is capable of displaying three dimensional images [see column 13 lines 64-66] and further disclose MRI [see column 78 lines 60-63] and X-ray [see column 75 lines 28-32].

Regarding claims 6 and 9, Sachar discloses locating catheter tip 377 using magnetic fields [see abstract, 0007, 0012, 0065, 0068-0073, 0117]. Catheter tip 377 location can be obtained without moving the catheter because the GCI uses sensor to track fiducial markers positioned on catheter tip 377 [see 0019].

Regarding claim 7, Sachar doesn't disclose a still image of the body volume.

However, Sachar discloses memory module such as RAM 1112, ROM 1111 [see 0067] that can save an image of the body volume (emphasis added).

In addition, Sachar discloses determining movement compensated location of catheter tip 377 [see 0019-0020]. Sachar discloses a servo system that has a correction input that compensates for the dynamic position of a body part, or organ,

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such as the heart, thereby offsetting the response such that the actual tip moves substantially in unison with the beating heart [see 0020].

Nevertheless, Evans et al teach a computer to provide still image of the moving of the site and displaying on the video display system an image of the heart in which the surgical worksite is made to be generally stationary or still [see column 7 lines 53-54]. The computer is designed to determine estimated movement compensated location [see column 27 lines 30-54].

Therefore, one skilled in the art at the time the invention was made would have been motivated to combine Sachar with Evans et al by using still image of body structures along with the movement compensating capability of Sachar to determine an estimated movement compensated location of catheter tip 377 in the still image; in order to accurately locate tip 377.

Regarding claim 8, Sachar doesn't disclose an ECG apparatus.

However, Sachar discloses electrocardiogram 502 [see 0108] that means an electrocardiogram apparatus is inherently disclosed.

Nevertheless, Evans et al teach an ECG apparatus 90 coupled to the computer [see column 21 lines 50-55].

Therefore, one skilled in the art at the time the invention was made would have been motivated to combine Sachar with Evans et al by using ECG apparatus 90; in order to acquire ECG data as needed or desired.

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3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sachar (Pub. No.: US 2005/0096589) stand alone or in view of Evans et al (US Pat: 6,468,265) as applied to claim 1 above and further in view of Viswanathan et al (Pub. No.: US 2005/0020911).

Regarding claim 3, Sachar doesn't explicitly mention supplement measured movement of the target in the movement model by interpolation.

However, Sachar discloses the controller interpolates [see 0106].

Nevertheless, Viswanathan et al teach measured catheter locations are interpolated [see 0034].

Therefore, one with ordinary skill in the art at the time the invention was made would have been motivated to combine Sachar with Viswanathan et al by using interpolation; in order to construct new data points.

Response to Arguments

4. Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL F. BRUTUS whose telephone number is (571)270-3847. The examiner can normally be reached on Mon-Fri 7:30 AM to 5:00 PM (Off alternative Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tse Chen can be reached on (571)272-3672. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. F. B./
Examiner, Art Unit 3777

/Tse Chen/
Supervisory Patent Examiner, Art Unit 3777